

NOTES ON THE PSEUDOPHOTOPSIDINÆ (MUTILLIDÆ) WITH DESCRIPTION OF THE FEMALE SEX

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The anomalous genus *Pseudophotopsis* differs from all other described Mutillid genera that lack an aculeiform hypopygium, in the presence of an anal lobe of the hind wing. For that reason it has been generally isolated by itself. Bradley and Bequaert (1928) first separated it as a subfamily from the Mutillinæ (s. str.), but unfortunately called that group the Photopsidinæ, possibly under the erroneous impression that the Photopsidoid wasps also possessed an anal lobe. Krombein (1939) rectified this by calling the group defined by Bradley and Bequaert as possessing an anal lobe of the hind wings, but no aculeus of the hypopygium, the Pseudophotopsidinæ. To my knowledge, Krombein therefore should be cited as the authority for that group. The writer (1946) more fully commented on the relationships of the Pseudophotopsidinæ, and agreed with Krombein that the group certainly deserved separation from the other Mutillinæ. I there also called attention to some of the other structural anomalies of the sole included genus, and commented on the erroneous affiliation of the genus to *Ephutomma* as indicated by Bischoff.

Bischoff (1920) diagnosed the genus *Ephutomma* Ashm. as having anal lobes of the hind wings. The material of *Ephutomma* examined by the writer lacks an anal lobe of the hind wings; it differs furthermore from *Pseudophotopsis* in the following fundamental characteristics:

a. lateral pronotal faces with the lower, anterior corner not bearing a depressed, foveate densely pubescent area, analogous and perhaps homologous with the felt lines of the second segment of the abdomen (true for both sexes).

b. tarsal claws lacking the internal tooth present in *Pseudophotopsis* (true for both sexes).

c. eyes deeply emarginate within in male (shallowly or not in *Pseudophotopsis*).

d. the tegulæ large, more or less conchiform in male (small and subcircular in *Pseudophotopsis*).

e. the petiole relatively short and stout in male, sessile or subsessile (generally elongate and nodose in *Pseudophotopsis*).

By definition then, the genus *Ephutomma* cannot be placed in the subfamily *Pseudophotopsidinae*. Critical study of the genitalia furthermore reveals profound differences, of subfamily status, between the two genera. The dilated, broad parameres of *Pseudophotopsis* allying that genus with the Apterogyninae rather than with the Mutillinae or Sphærophthalminæ.

André, as early as 1903, emphasized another of the very basic differences between *Ephutomma* and *Pseudophotopsis*: the wing venation. The complete cells R_3 and M_2 of *Ephutomma*, together with the hyaline, reduced stigma, differentiate it remarkably from the undefined or scarcely indicated (by color lines) cells R_3 and M_2 of *Pseudophotopsis*, where the stigma is very large, deeply sclerotized and pigmented.¹

Bischoff's statement that the two genera may well be found to be merely subgenerically different is therefore to be interpreted rather as an indication of superficial treatment of the group, rather than as a valid statement. Apparently Bischoff (1920) mixed the genera *Pseudophotopsis* and *Ephutomma*, and his diagnosis in the key was possibly partly or entirely based on an individual or individuals of *Pseudophotopsis* which he considered to be males of *Ephutomma*. This leaves one in the position of not knowing where to put the various species in the two genera, since the lines between these distinct groups have obviously not been sharply differentiated.

Critical subsequent study of the male genitalia reveals that the gap between *Ephutomma* and *Pseudophotopsis* males is indeed very great. The slender form of the parameres in *Ephutomma* clearly allies it with the other Mutilline (and Sphærophthalmine) genera, whereas the broad, flattened, oval or lanceolate parameres of *Pseudophotopsis* in many ways approach those of the

¹ The more complete venation of *Ephutomma* also indicates a direct derivation of that genus from *Pseudophotopsis* is quite impossible.

Apterogyninæ. The unique form of the ædægus, however, isolates it from the Apterogyninæ, as well as all other mutillid groups known to me. The anomalous position of *Pseudophotopsis* is therefore even more clarified. In the armed tarsal claws, as well as in the nature of the hind wings, and in the form of the genitalia, it approaches the Apterogyninæ. It may therefore well be considered an annectant genus, related to the other Mutillids lacking a hypopygial aculeus, but also standing near to the common ancestral form that led to the Apterogyninæ.

The genus *Pseudophotopsis* therefore may be considered as one of the critical points about which our whole classification of the Mutillidæ pivots. Since it occupies that critical position there has been considerable speculation as regards the form of the female sex. Radoszkowski as early as 1887 described a female he believed to belong to *Pseudophotopsis*. Bischoff (1920) comments as follows regarding this female: "Als Weibchen der *Agama caspica* beschrieb Radoszkowski . . . eine Form, die mir im Typus vorliegt. Dieses Weibchen ist dem der *Ephutomma incerta* Rad. so ausserordentlich ähnlich, dass es André für die gleiche Art hielt. Ob dieses Tier überhaupt eine *Pseudophotopsis* und nicht eine echte *Ephutomma* ist, muss noch, das bisher keine weiteren zur Gattung *Pseudophotopsis* gestellten Weibchen bekannt sind, dahingestellt bleiben." This uncertainty could have been resolved by Bischoff, had he clearly differentiated between the two genera in the male sex, since the females of *Pseudophotopsis* possess two unique characteristics, that are shared with the male, not found in either male or female in other related groups. These characters are the foveate depressions, filled with hairs, of the anteroventral corners of the sidepieces of the pronotum, and the strong inner tooth of the tarsal claws. These, though occurring in both male and female of *Pseudophotopsis*, do not occur in *Ephutomma* males and females, or any other genus of the Mutillinæ or Sphærophthalminæ. Bischoff, however, stated that: "Die Gattungen *Pseudophotopsis* und *Ephutomma* stehen sich aber so nahe, dass es immerhin denkbar wäre, dass das vorliegende Weibchen (i.e., the female described by Radoszkowski, and above referred to) tatsächlich hierher gehört. Es wäre dann allerdings zu erwägen, ob man nicht die Gattung *Ephutomma* besser als Untergattung zu *Pseudophotopsis*

stellen würde, zumal generische Unterschiede nur im männlichen Geschlecht vorhanden zu sein scheinen." In the writer's opinion, however, essential differentiating characters exist between *Ephutomma* and *Pseudophotopsis* in both sexes that make the disposition of *Pseudophotopsis* in an isolated subfamily, while *Ephutomma* is placed in the Mutillinæ, justified. It is not to be denied that there is considerable similarity of an obvious nature between the two groups, especially in the female sex (which, with the possible single exception of the individual described by Radoszkowski, has been universally confused with *Ephutomma*). However, the male genitalic characters, as well as the external characteristics of both male and female (especially the apparently critical presence of armed tarsal claws), indicates that the obvious relationships are largely of a superficial, perhaps partly of a homoplastic, rather than fundamental nature. It appears more likely that both of these genera are relatively archaic, but that *Pseudophotopsis* is much more so, while *Ephutomma* evolved from it (or from near it) essentially by loss of the anal lobes, loss of the lower epaulets, and loss of the armature of the tarsal claws, together with the innovation of some new characters (that have become characteristic of the whole subfamily Mutillinæ), such as a sessile male petiole, reduction of the stigmatic cell, increase in size of the tegulæ, and more obvious development of the excision of the inner orbits of the eyes. Such a concept closely follows the linear pattern outlined by the writer (1946) in both the male and female sex, though at that time the female sex was unknown to the writer.

The relatively inadequate material of this entirely Old World group available makes a revision of the two genera impossible at the present time. It is hoped, however, that the following generic diagnoses, covering both sexes, will adequately separate both male and female in the future. Since I have not had enough material, I cannot cite the synonymy for most of the females previously placed in *Ephutomma* (though several of these will certainly be found to represent *Pseudophotopsis*). European students, with adequate material available, however, should easily be able to prepare such a catalogue, which is certainly desirable.²

² Since Bischoff (1920, p. 23) diagnoses *Ephutomma* as possessing anal lobes of the hind wings, study of the male sex would also be profitable, since

Subfamily PSEUDOPHOTOPSIDINÆ

Male: Head with large ovate to ovate-elliptical eyes, usually approaching the mandibles (i.e., malar region suppressed), with the inner orbits not or slightly excised; facettation distinct. Clypeus simple, the epistomal suture not bearing the anterior tentorial pits (these somewhat dorsad of the suture). Antennal tubercles distinct (i.e., the lamellate, rim-like expansions of the vertex bounding the antennal ossæ distinct). Ocelli large, salient. Mandibles with a strong ventral excision, subtended by a salient ventral tooth. Antennæ with scape extremely elongate (contrasted to the Apterogyninæ).

Alitrunk with pronotum reduced (as in Sphærophthalminæ), with dorsal face reduced along midline because of encroachment of mesoscutum; lateral pronotal faces on lower anterior corners with a conspicuous depressed, densely puberulent pit-like region (the ventral "epaulets"), perhaps representing the opening of a gland. Parapsidal furrows deep, complete. Metatergum usually with a pair of distinct, erect teeth. Tegulæ small, subcircular, not hiding the axillary wing-sclerites beneath them. Wings with lamina pale, the fore-wings with only two cubital and one discoidal cell; stigma large, distinct, pigmented and sclerotized throughout. Hind wings with a distinct, small anal lobe, but no pre-axillary incision; cubitus inserted basad of transverse median vein. Legs with calcaria 1-2-2; tarsal claws very distinctly armed, near middle of inter edges, with a small tooth. Metapleura rectangular, oblique sclerites, subequally wide throughout, divided into a dorsal portion and ventral portion by a horizontal suture ending posteriorly in the endophragmal pit; metapleural-propodeal suture nearly straight, not angled towards the meso-metapleural suture.

Gaster with petiole elongate, rather slender, at most sessile with second tergite. Second segment with both dorsal and ventral felt lines. Hypopygium flat, unarmed, well-developed. Genitalia highly specialized, the parameres laterally compressed and flattened (as in Apterogynine-Typhocetine developmental line, but quite unlike the Sphærophthalmine-Mutilline developmental line); ædæagus with the two lateral halves also strongly dorso-ventral, laterally compressed, flattened plates (except for the arm-like apodemes), the distal portions with a group of stout peculiar spine-like, socketted teeth.

Female: Head narrower than thorax, usually rather well developed behind

it is almost certain that Bischoff confused the two genera in the male sex, as well as in the female sex. Bischoff's *Ephutomma pallipes*, with a uniformly sclerotized stigmatic cell, will probably be found to represent a species of *Pseudophotopsis*. Indeed, Bischoff speaks of that species as forming, in several ways, a transition to *Pseudophotopsis*. It is possible that that species was before Bischoff, when he made his key to genera, since every male unquestionably belonging to *Ephutomma* that I have had occasion to study lacked all trace of anal lobes.

the eyes, very coarsely sculptured; vestigial ocelli present; clypeus short and transverse; mandibles large, ventrally strongly emarginate and armed with a large, rounded tooth. Thorax subrectangular, but narrower posteriorly than anteriorly because of a slight dilation of the prothorax and a rather distinct constriction in the mesonotal area; a distinct dorsal division of the alitrunk into pro-, meso- and metapleural portions occurs, but the sutures are obviously so reduced as to be non-functional; the lateral faces of the prothorax are nearly flat, largely devoid of sculpture. The legs have distinctly armed tarsal claws. The petiole is broad, sessile; the gaster (in species seen) has distinct felt lines of both sternum and tergum; the pygidium is not sharply defined; foveate and densely hirsute depression of the lower angles of the prothorax developed similarly as in male sex.

The definition of both sexes is quite similar to that of *Ephutomma*, but the diagnosis differs from the latter genus in that both male and female have armed tarsal claws, and both have the prothorax with the anteroventral depressed, foveate pubescent region. Bischoff (1920) indicates several other differences between the male sex, which, however, represent mere tendencies. A further distinction may occur in the female sex, which will have to be checked with more adequate material, namely, the form of the thorax. In *Pseudophotopsis syriaca* (= *Ephutomma syriaca* auct.) the prothorax is relatively narrow, but little wider than the rest of the alitrunk, and the thorax has a more rectangular appearance than characteristic for *Ephutomma*; it is furthermore more elongate and nearly twice as long as its greatest width. Whether this character of the alitrunk, which occurs constantly in all females I can refer to *Pseudophotopsis*, is a valid generic character is still uncertain, however.

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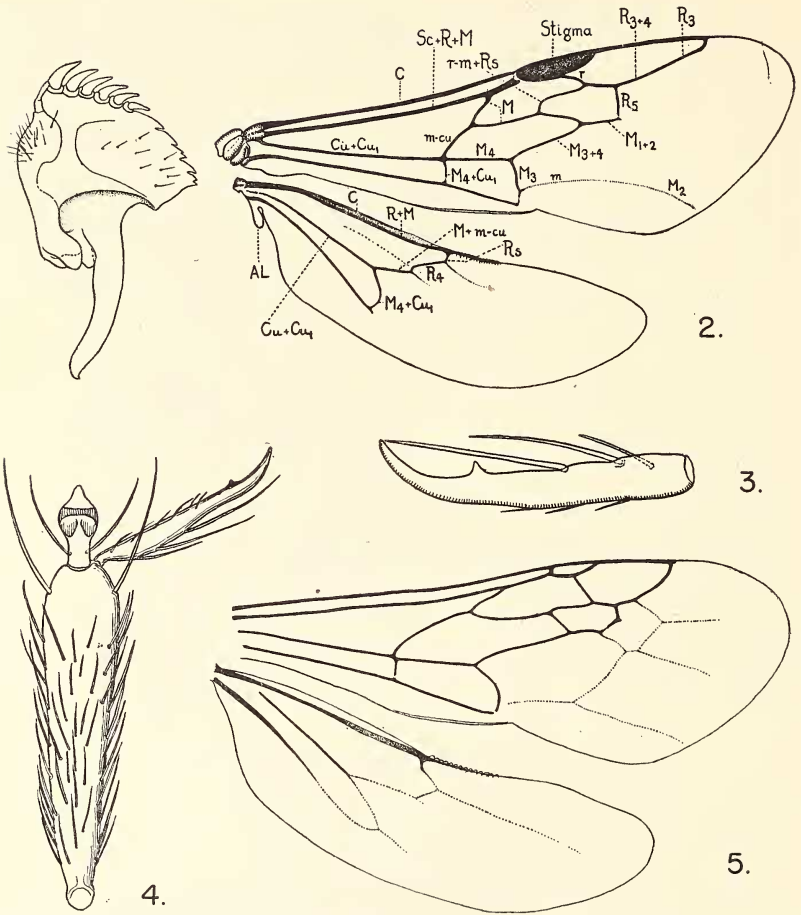


PLATE XVII

- FIG. 1. Ental face of aedeagus of *Pseudophotopsis komarowii*.
FIG. 2. Wings, with veins lettered, of *Pseudophotopsis komarowii*.
FIG. 3. Tarsal claw of *Pseudophotopsis komarowii*.
FIG. 4. Metatarsus, tarsal claw, and pulvillus, of *Pseudophotopsis komarowii*.
FIG. 5. Wings of *Ephutomma elongata* Rad.